

over will be the equivalent of a cut to about 7.2 beds per 1000 elderly population over the next 15 years. To achieve a norm of 8.5 beds by the year 2000 would require all geriatric units to start with a norm of 10 beds now. The hard facts are that more funding, for both hospital and local authority social services, is required merely to maintain the already inadequate level of care as the population of very old people increases.

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## Pseudomonas aeruginosa and whirlpools

The whirlpool or Jacuzzi is a North American invention which has flourished there since the early 1970s but has only recently been introduced into Britain. Hot water is agitated mechanically through pressurised jets in a large tub and gives the bather a pleasurable sensation. Bathing in the company of others is usual.

A rash associated with contamination of whirlpools by *Pseudomonas aeruginosa* was first described in 1975 by McCausland and Cox.<sup>1</sup> Since then more outbreaks have been reported from the United States; in some of these, organs other than the skin have also been affected. The largest epidemic so far affected 76 people, a quarter of the guests staying at a hotel in Atlanta, Georgia.<sup>2</sup> The first Australian outbreak was described in 1983.<sup>3</sup> British outbreaks have not been reported.

Recently a dentist, his wife, and two children spent a Sunday at a hotel in East Anglia with some friends. The dentist, one of his children, and the friends used the hotel

Jacuzzi. Twenty four hours later all the members of the party—other than the dentist's wife and the child who did not use the whirlpool—developed a widespread eruption over the torso and limbs but sparing the face. The rash consisted of pustules surrounded by erythema. The dentist and his child consulted their general practitioner, and the friends independently consulted their own. Both doctors diagnosed chickenpox. The dentist, who remembered having had chickenpox, was unconvinced and saw a second general practitioner. On this occasion a swab was taken from a pustule, *Ps aeruginosa* was grown, and the correct diagnosis of pseudomonas folliculitis was made. A swab from the child grew the same organism. The eruptions took roughly 10 days to disappear. The dentist felt perfectly well throughout the illness, but his child was generally unwell. The community health physician was told, but the results of investigation of the spa were negative because the hotel had already taken disinfectant measures of its own after hearing from the dentist.

Folliculitis is the most common hazard of the use of whirlpools. All manner of diagnoses may be made unless the physician is aware of the condition and elicits the history of exposure to a whirlpool. The rash is extensive and affects all areas except the palms and soles—and usually the face since it is not ordinarily immersed. The lesions are pruritic red papules and pustules. Concomitant symptoms may include sore eyes and throat, mastitis, malaise, fever, and axillary lymphadenopathy. The condition usually resolves within 10 days, and no specific treatment has been found effective. Otitis externa has been described (usually only if the head has been immersed) and an epidemic of over 300 cases over a year has been described from a contaminated whirlpool in the Netherlands.<sup>4</sup> Urinary tract infections have been reported in two adolescent girls and one young man, who became ill with hypotension and clouding of consciousness before he was resuscitated.<sup>5</sup> He was thought to have contracted the infection by ejaculating into contaminated water jets in the whirlpool. *Pseudomonas pneumonia* has been documented in a healthy man who acquired the infection by aspiration of organisms in his home whirlpool.<sup>6</sup>

*Ps aeruginosa* is a Gram negative bacterium which favours an aquatic environment. In typical outbreaks it may be grown from the skin lesions, from the water, and from the area immediately surrounding contaminated whirlpools. Various serogroups have been implicated but 0:11 in particular. Although occasional outbreaks have occurred in swimming pools,<sup>7</sup> especially in conjunction with the use of a sauna,<sup>8</sup> whirlpools appear to offer a particularly suitable environment. The bacteria flourish in the hot water and multiply rapidly if the free chlorine concentration drops below 0.5 mg/l or the alkalinity rises above pH 7.8. Adequate chlorine concentrations are difficult to maintain because the turbulent water flow and heat promote evaporation. Organic matter and ammonium compounds excreted by a high number of bathers in a relatively small volume of water ("high bather load") provide ideal nutrient for the bacteria and tend to inactivate chlorine. Furthermore, as the alkalinity of the water rises the chlorine is converted to hypochlorite, which is a less effective bactericide. Finally, the skin itself is more vulnerable in a whirlpool since the hot water dilates the follicular orifices, facilitating the entry of the organism.

Standards of pool hygiene must be as high as feasible, and guidelines have been issued by the United States Department of Health.<sup>9</sup> Prudent hotel visitors might think twice before using a Jacuzzi, and certainly any patient immunocompro-

misled by disease or drugs (including systemic steroids) should be warned of the hazards.

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## Screening for treatable diabetic retinopathy

Diabetic retinopathy is second only to macular degeneration as a cause of blindness in the developed world. It is the leading cause of blindness in the working age group (p 1052),<sup>1-4</sup> accounting for 15.7% of the registered blind below the age of 65 in England and Wales.<sup>5</sup>

Diabetic retinopathy causes blindness either from the formation of new vessels with vitreous haemorrhage and traction retinal detachment or from macular disease, which lowers central acuity.<sup>6</sup> Half the eyes with untreated proliferative retinopathy and other high risk features develop severe loss of vision within five years.<sup>7</sup> Proliferative retinopathy and maculopathy are not mutually exclusive, but the development of new vessels is more frequent in insulin treated (type I) diabetics, while maculopathy is more common in non-insulin-treated (type II) diabetics.<sup>8</sup> Retinopathy is uncommon in type I diabetics of less than five years' duration,<sup>9-10</sup> but three quarters of them have retinopathy after 20 years.<sup>11-13</sup> In type II diabetics the duration of the diabetes is uncertain and retinopathy may be present at diagnosis.<sup>9-13a</sup>

Several large, multicentre, randomised controlled clinical trials have shown that loss of vision from maculopathy or proliferative retinopathy may be prevented by xenon arc or laser photocoagulation.<sup>13a-19a</sup> An estimated 60% of blindness might be prevented in this way,<sup>20-22</sup> but the lesions must be detected at an early treatable stage.

Burns-Cox and Dean-Hart have recently investigated making use of ophthalmic opticians for screening diabetics (p 1052). All the opticians in the Frenchay health district were asked to a meeting at which the scheme was explained to them and they readily cooperated. Eight hundred and thirty seven reports were received by the hospital. Patients referred with serious retinopathy were reviewed at the Bristol Eye Hospital and treated with photocoagulation where appropriate. A sample of those reported as negative were also reviewed. Though the numbers were depleted by death and

other causes, important conclusions may be drawn if it is assumed that those reattending were a representative sample of the population screened. The prevalence of serious retinopathy was 4%, less than that found in clinical studies. A detection rate of 79% could be calculated, assuming no reattendances or overlap of patients in their two series. This compared well with that for established methods of screening in other disciplines—for example, screening for neural tube defect by measuring maternal  $\alpha$  fetoprotein concentrations.<sup>20</sup> The false positive flow was low, with a sensitivity for the test of 96%. These results speak favourably for the use of ophthalmic opticians in screening.

A large screening programme carried out in the west of Scotland used ophthalmologists and diabetologists to detect serious retinal disease in patients attending a diabetic clinic.<sup>21</sup> In this study pupils were dilated, whereas in the Frenchay study they were not. The prevalence of serious retinopathy was 9.11%—more than double that found by Burns-Cox and Dean-Hart. The incidence of new cases was 1.2% a year. Clinic diagnoses were found to be correct in three quarters of cases whether diagnosed by diabetologists or ophthalmologists. Three quarters of these were amenable to treatment by photocoagulation. Foulds *et al* applied these findings to the diabetic population of the west of Scotland and calculated the cost of providing a clinic based screening service for the expected 25 000 patients, employing an ophthalmologist or a physician and a nurse, to be £55 300 a year.<sup>21</sup> Screening of this number by ophthalmic opticians or ophthalmic medical practitioners would cost about £215 000 a year, without adjusting for those who attend already.

Ophthalmic opticians and ophthalmic medical practitioners are well placed to screen diabetics in the community.<sup>22</sup> They are trained to recognise eye disease, usually without pupil dilatation, they regularly measure corrected visual acuity, maintain good records, and can therefore determine both the absolute level of acuity and any fall in acuity in follow up visits. Their numbers are such that diabetics requiring screening would have easy access to the service, and this would encourage attendance. But the costs of this approach have not been debated.

Diabetologists work in centralised clinics, which are consequently less accessible. The west of Scotland study suggests that the diagnostic skills of trained diabetic physicians may equal that of ophthalmologists. Dilatation of the pupils is probably important in this setting. General practitioners form the other obvious group who might well engage in screening diabetic patients under their care. Only about 20 patients would require screening by each individual general practitioner, or a larger number within a group practice could be handled within a miniclinic. General practitioners do not regard their skills with the ophthalmoscope highly, but these skills might be reinforced by regular postgraduate instruction, and patients would welcome the screening being performed by the clinician already responsible for their diabetic care.

There is no simple solution to the problem of screening for serious retinopathy. The personnel and their best location have to be decided. The education of diabetic patients to attend for screening is as important as providing the infrastructure to ensure the annual visits and the centres for screening, referral, and treatment. Whatever system is finally adopted it must ensure that those clinicians concerned with diabetic care are kept in touch with the outcome of retinal assessment and treatment.

In recent years the DHSS has made efforts to provide adequate facilities for diabetic photocoagulation in eye